Teaching guide

IDENTIFICATION DETAILS

Degree:	Diploma in Biotechnological Research Methodology (UFV-Awarded Title associated with Biotechnology)
Field of Knowledge:	Science
Faculty/School:	Experimental Science
Course:	RESEARCH PROJECT
Type:	Compulsory Internal
ECTS credits:	5
Year:	4
Code:	20116
Teaching period:	Seventh semester
Teaching type:	Classroom-based
Language:	English
Total number of student study hours:	125

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SUBJECT DESCRIPTION

The subject Research Project aims to give students a solid training in lab work in order to provide them with a better access to the labour market and also to further their theoretical education as a part of the degree course.

This subject is taught during six months of the fourth year of the Biotechnology Degree course, amounting to 125 hours of study and concluding with the issue of the UFV's self-awarded title of Expert in Biotechnology Research Methodology. The subject includes a research project with a specific objective that must be achieved. The project includes the design of experiments which are subsequently carried out in the laboratories of the Universidad Francisco de Vitoria and the presentation and discussion of the results obtained. For the successful execution of this research project, content and techniques of various subjects taught during the Biotechnology Degree course will be applied.

GOAL

To acquire the independence and ability to design experiments in order to reach the proposed objectives, carrying out a thorough analysis of the results and critically evaluating them using scientific methodology.

The specific aims of the subject are:

To develop the ability to resolve both practical and theoretical problems related to the experiments carried out.

To develop the strategy, the search for protocols and the execution of the necessary experiments in order to obtain the results corresponding to a hypothesis proposed by the lecturer.

To reinforce the ability to keep the laboratory notebook in good order for experiments to be correctly reproduced.

PRIOR KNOWLEDGE

Those corresponding to the degree.

COURSE SYLLABUS

The main goal of this Research Project is the optimization of the adhP gene over-expression. This gene should be PCR amplified and cloned in the over-expression plasmid pGEX-4T2 as a GST fusion gene. This process includes the following:cloning strategy, construction of the over-expression plasmid, bacterial transformation, fusion protein over-expression, optimization and results analysis.

EDUCATION ACTIVITIES

Theoretical study and preparation of face-to-face activities:: Research Project teachers will provide materials and equipment to the student and will establish a specific goal. To successfully complete this subject, the student must design an experimental strategy aimed at achieving the proposed goal and write a Research Project Memory.
Seminars, round tables, workshops, tutorials, debates: This process will be under supervision of the Research Project teachers during both collective and individual tutorials.
Practical classes: Once the Memory has been assessed and approved by the teachers, the student will perform the necessary laboratory work to accomplish the desired goal Virtual network work.
In order to study and discuss the results obtained during the practical laboratory sessions, students must write a Final Report with the results, discussion and conclusions of the experimental work.

DISTRIBUTION OF WORK TIME

CLASSROOM-BASED ACTIVITY	INDEPENDENT STUDY/OUT-OF-CLASSROOM ACTIVITY
50 hours	75 hours
Seminars, round tables, workshops, tutorials, debates Practical classes: exercises, practical cases and experimental work carried out in the laboratory	Autonomous study: theoretical study and preparation of face-to-face activities Virtual network work

SKILLS

To design an experimental protocol based on theoretical knowledge in a host of subjects.

To organise and correctly plan work in the laboratory.

To describe and quantify the results of experimental performed in the laboratory.

To properly analyse the results from experimental work.

To critically assess the results of experiments performed in the laboratory.

To appy the theoretical knowledge acquired for solving problems and practical cases linked to the various subjects.

Capacity of written communication of the knowledge acquired.

To approach a subject by means of rigorous, profound and comprehensive thought.

LEARNING RESULTS

To develop written communication skills

To be able to organise and plan time effectively

To be able to design and correctly execute experimental protocols

To apply the fundaments and concepts obtained during the practical sessions so as to obtain results

To critically analyse the results obtained from experimental work

To effectively evaluate experiment results in order to come to the right conclusions

To discuss experiment results with criteria

LEARNING APPRAISAL SYSTEM

ORDINARY EVALUATION SYSTEM
1. Evaluation of the theoretical content (55%): The elaboration of work protocols (25% of the final grade); those students who do not pass the elaboration of work protocols will not be able to enter the laboratory. They will be deemed to have failed the subject in ordinary assessment period and will have to take an extraordinary written/practical exam (extraordinary assesment period). Laboratory work conclusions (30% of the final grade); those students who do not pass the elaboration of lab work conclusions will be deemed to have failed the subject in ordinary assessment period and will have to take an extraordinary written exam (extraordinary assesment period).
2. Evaluation of seminars: realization and presentation of exercises, study of cases, debates, tutorials, etc: (5%) 3. Evaluation of the practicum: behaviour, interest, cleanliness, resolution of experimental proposals, analysis of results,… (40% of the final grade); those students who do not pass the laboratory work will be deemed to have failed the subject in ordinary assessment period and will have to take an extraordinary written/practical exam (extraordinary assesment period). Attendance to the collective tutorials is compulsory and therefore indispensable for the subject results to be assessed. It is essential to have achieved a minimum grade of 5 or more in each of the three areas for the average mark to be subsequently calculated.
ALTERNATIVE EVALUATION SYSTEM The same percentages and contributions are maintained as in the ordinary evaluation. Students in 2nd or subsequent enrollments must contact the coordinator and do all the activities layed out in the ordinary evaluation system. The activities passed in the ordinary call will be saved for the extraordinary call during the same academic year but not for the following.
The behaviors of plagiarism, as well as the use of illegitimate means in the evaluation tests, will be sanctioned in accordance with those established in the University's Evaluation Regulations and Coexistence Regulations"

BIBLIOGRAPHY AND OTHER RESOURCES

Basic

Sambrook, Joseph. Molecular cloning: a laboratory manual / 4th ed. New York :Cold Spring Harbor Laboratory Press,2014.

Sambrook, Joseph. The condensed protocols: from "Molecular cloning : a laboratory manual" / New York :Cold Spring Harbor Laboratory Press,2006.